FC (high temperature amorphous fluorocarbon) layer 220. Ye does state that in the alternative that a hydrogen/nitrogen based plasma may be used to etch the α-FC layer 220, and that in the alternative a hydrogen/nitrogen based plasma may be used in place of an oxygen and nitrogen plasma to etch the α-FC layer. It is not obvious that substituting etch chemistries for etching an α-FC layer would allow the same substitution of etch chemistries for etching a low-k organic dielectric layer. Instead, col. 6, lines 47-50, of Ye et al. teaches away from a fluorocarbon and active etchant of nitrogen and hydrogen for etching a low k dielectric, stating that the etchants with fluorine tend to have a detrimental effect on a typical contact via or trench etch profile. Therefore, it would not be obvious under Tao in view of Ye to have an etchant gas of a fluorocarbon and an active etchant of nitrogen and hydrogen. Since the etch from Tao in view of Ye would be different, there would be no inherent result of sputtering some of the hardmask with the active etchant and forming a volatile compound from sputtered hardmask and fluorine, thus reducing micromasking, as recited in claim 19.

Claims 20-37 each depend either directly or indirectly from the independent claim 19, and are therefore respectfully submitted to be patentable over the art of record for at least the reasons set forth above with respect to claim 19. Additionally, these dependent claims require additional elements that when taken in the context of the claimed invention, further patentably distinguish the art of record.

For example, claim 20 recites that the active etchant is selected from the group consisting of hydrogen and ammonia. As discussed above the Tao and Ye do not make obvious the use of an active etchant from the group consisting of hydrogen and ammonia with a fluorocarbon for etching a low-k dielectric layer.

In addition, claim 22 recites that the active etchant is ammonia with a flow of about 100 sccm to about 3000 sccm. Ye in col. 23, lines 30-37, as cited by the Examiner, states that the principal plasma source gas is methane, which may be used in combination with ammonia, and that the volumetric flow rate of the source gas is in the range of 50-100 sccm, with additive etchant species source gases, which includes the ammonia, being present in lesser amounts. Therefore Ye does not teach ammonia with a flow rate of about 100 sccm to about 3000 sccm. In addition, In addition, nothing in Tao nor Ye suggests combining the flow rates of Tao and Ye, or that such a combination would be successful in providing a desired etch. The Examiner stated that a skilled artisan understands such properties. However, it would not have been obvious to a

skilled artisan that such a combination of flow rates would cause some of the sputtering of the hardmask and the forming of a volatile compound from the sputtered hardmask and fluorine, as claimed. Therefore it would not be obvious to an artisan to provide the needed combination to obtain these unobvious results.

In addition, claims 26 and 27 further recited very specific flow rates for nitrogen and hydrogen and CH_3F, which are not taught by the cited references. Since none of the cited references disclose or make obvious the steps of sputtering some of the hardmask and then forming a volatile compound from the sputtered hardmask and fluorine, it would not be obvious to an artisan to change the flow rate to obtain the sputtering of some of the hardmask and then forming a volatile compound from the hardmask. For at least these reasons, claims 20-37 are not made obvious by Tao in view of Ye.

Applicants believe that all pending claims, as amended, are allowable and respectfully request a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at telephone number (831) 655-2300.

Respectfully submitted,
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